

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Photon Acceleration by Laser Wakefields CHRISTOPHER MURPHY¹, RAOUL TRINES, ROBERT BINGHAM², KATHRYN LANCASTER, OLEG CHEKHLOV, PETER NORREYS, CCLRC - Rutherford Appleton Laboratory, Chilton, Didcot, UK, JOSE TITO MENDONCA, LUIS SILVA, Instituto Superior Tecnico, Lisbon, Portugal, STUART MANGLES, CHRISTOS KAMPERIDIS, ALEXANDER THOMAS, KARL KRUSHELNICK, ZULFIKAR NAJMUDIN, Blackett Laboratory, Imperial College, London, UK — In recent times, theory and simulation have been able to reproduce photon acceleration from wakefields where light is up- shifted in frequency by a moving refractive index gradient. The effect has been considered as a possible method of diagnosis of a wakefield such as the one postulated for a compact electron accelerator. Here we present further observations of spectral modulation caused by a laser-produced wakefield. In our experiments, the Astra laser at the Rutherford Appleton Laboratory was focused into jet of helium. Between 300mJ and 600mJ of laser energy was delivered into a 25 micron focal spot in pulses between 50fs and 200fs. The spectrum of the transmitted light was measured. The lower intensity laser pulse allowed a linear regime to be investigated. A photon kinetic code has been implemented to model the experiment. The feasibility of using this effect as a wakefield diagnostic will be discussed.

¹Also at Imperial College, London

²Also at University of Strathclyde, Glasgow, UK

Christopher Murphy
CCLRC - Rutherford Appleton Laboratory, Chilton, Didcot, UK

Date submitted: 21 Jul 2006

Electronic form version 1.4